

APPLICATION  
FOR  
UNITED STATES LETTERS PATENT  
ENTITLED

DISTRIBUTED SEARCH SYSTEM AND METHOD

TO WHOM IT MAY CONCERN:

BE IT KNOWN THAT DR. LARRY R. HARRIS of 94 Annursnac Hill Road, Concord, MA 01742 invented certain new and useful improvements entitled as set forth above of which the following is a specification:

PATENT GROUP  
FOLEY, HOAG & ELIOT LLP  
ONE POST OFFICE SQUARE  
BOSTON, MA 02109-2170  
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5 DISTRIBUTED SEARCH SYSTEM AND METHOD  
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10 CLAIM OF PRIORITY  
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This application claims priority to U.S.S.N. 60/221,546 entitled "Distributed Natural Language Search Method", naming Larry R. Harris as inventor, and filed on 28 July 2000, the contents of which are herein incorporated by reference in their entirety.

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1 depends on customers' ability to locate products and/or  
2 information easily and quickly; however, industry statistics  
3 indicate that over seventy percent of potential customers to  
4 internet websites leave the websites without finding their  
5 desired product(s)/information. This result is not desirable for  
6 the website in generating profits directly through internet  
7 sales, or indirectly through advertising revenue.

8 First generation techniques for finding products and/or  
9 information on the internet were advertiser-based and listed  
10 websites, rather than individual products. Second generation  
11 techniques involved aggregating product and other information  
12 from multiple supplier sites (product catalogs) at online  
13 shopping malls or business-to-business "vortals" to allow  
14 consumers to access consolidated listings across multiple  
15 suppliers. It is anticipated that the next generation supplier  
16 networks may dynamically access information from relevant  
17 suppliers in response to a buyer's requirements and present only  
18 the suppliers and products that precisely meet the consumers'  
19 needs.

20

21 SUMMARY

22 The present disclosure provides a system and method for  
23 performing a search of data sources that can reside on a network  
24 such as the internet. The search can be specific to the content

1 and organization of the data sources. The search can also be a  
2 distributed search to multiple data sources. Data sources can  
3 include textual documents such as web pages that can include  
4 program instructions, and other types of text documents, text  
5 files, and databases, although other data sources can be  
6 included. The data sources can reside on one or more servers or  
7 other devices on a network. Searches or queries can be initiated  
8 using natural language expressions, sentences, keywords, or  
9 combinations thereof, from which data source content-specific  
10 queries can be generated and executed. In some embodiments, a  
11 dynamically generated customized query can be formed and issued  
12 for each data source to be searched or queried.

13 In one embodiment, the methods and systems can provide an  
14 application that can be installed on a subscriber's server to  
15 allow a website and/or other data sources accessible to the  
16 server, to be searched without requiring pre-integration,  
17 reformatting, etc. of the server or the data on the server. In  
18 another embodiment, the application can reside on another device  
19 or server that can be in communication with the subscriber's  
20 website server. For the purposes of the methods and systems  
21 described herein, a "website" can be understood to include a  
22 document on a network such as the internet or an intranet, that  
23 can include a home page and other documents and files that can be  
24 accessed through the webpage either directly or indirectly, and

1 the website can also include databases that can be accessed  
2 directly or indirectly. The application can develop a customized  
3 query for the website and/or other data sources accessible to the  
4 server, using wired or wireless communications systems and  
5 protocols.

6 When a subscriber maintains a product catalog database, for  
7 example, the installed application can access the database and  
8 build a customized dictionary that can convert a natural language  
9 or keyword search query to a precise SQL query for the  
10 subscriber's product catalog database. Additionally and  
11 optionally, if the target of the search is text, the installed  
12 application can build a custom dictionary can generate an  
13 advanced text search of the website using one or more standard  
14 text search engines that may be otherwise installed at or  
15 available to the website.

16 In some embodiments, the methods and systems can allow an  
17 internet user or other internet accessible entity, including non-  
18 human entities, to initiate a search from, for example, a  
19 website. Such a website can hereinafter be referred to as an  
20 initiating website, and can be the network location from which  
21 the search can be broadcast or distributed to subscriber websites  
22 and hence, customized dictionaries. In one embodiment, the  
23 customized dictionaries can receive a HTTP command and thereafter  
24 reach behind security measures such as firewalls to access

1 otherwise protected or secure data. The systems and methods can  
2 also allow subscribers to receive a search command or query  
3 information from the initiating website, utilize the subscriber's  
4 local customized dictionary to translate the search for the  
5 respective website, data source, etc., initiate a customized  
6 search of the subscriber's website, data source, etc., and  
7 extract the relevant information for submission as search results  
8 to the initiating website. In one embodiment, the search can be  
9 an SQL search or a text search.

10 In one embodiment, the application at a particular  
11 subscriber's server can immediately determine from the received  
12 search command and the customized dictionary, that a search may  
13 not be necessary because the website and/or data source may not  
14 include relevant information, products, services, etc.

15 In an embodiment, the search results from subscribers can be  
16 formatted in XML, and the initiating website can receive the  
17 multiple search results and integrate the XML results for  
18 presentation to a user at the initiating site. The results can  
19 also be formatted for presentation by email, instant messaging,  
20 or for voice. In some embodiments, the query can be submitted by  
21 email, instant messaging, or voice.

22 The methods and systems can produce search results that can  
23 include a subscriber (supplier) name, a product name or  
24 identifier, a product price, a product description, a product

1 image, etc. In one embodiment, the user's (or querying entity's)  
2 selection of a product can provide a transition to an order  
3 basket that can be at the initiating website, the subscriber's  
4 website, or an alternate website. In one embodiment, search  
5 results can be accompanied by a URL of the order processing  
6 system that can be used to order the product; and, when the user  
7 selects the item, the relevant product information can be  
8 submitted to the purchasing system to initiate the purchase  
9 process.

10 The methods and systems can allow a subscriber to access and  
11 search a cooperating subscriber's website and products in a peer-  
12 to-peer relationship.

13 The methods and systems can accommodate customized searches.  
14 Accordingly, a user can establish an account or profile that can  
15 be transmitted or otherwise associated with the search or query  
16 request from the initiating device or website. The user's  
17 profile can be incorporated into the customized searches at the  
18 subscriber websites. In one embodiment, the user can transmit  
19 the profile with the query information or search request, while  
20 in another embodiment, the user can be identified at the  
21 initiating device or website by an account number that can allow  
22 access to a locally or centrally stored profile for submission  
23 with the inquiry. In yet another embodiment, a user can submit  
24 or otherwise be associated with a profile such that subscribers

1 can customize a search or query based on the user profile and/or  
2 identity.

3 The methods and systems can allow a user to customize the  
4 presentation of search results. For example, a user can select  
5 an option to view search results by price. In an embodiment, a  
6 subscriber can customize or otherwise control the search results.

7 For example, a subscriber may not produce a search result for a  
8 particular product unless the inventory level for that product  
9 exceeds a particular value.

10 In one embodiment, subscribers can update respective  
11 customized dictionaries to produce more accurate searches that  
12 can reflect changes in terminology, etc. In an embodiment, a  
13 dictionary can be updated locally or remotely via a wired or  
14 wireless network.

15 The methods and systems can allow hierarchical searching of  
16 multiple servers and/or data sources using a "broker" dictionary  
17 that can receive query information and/or a search request from  
18 the initiating website or device, and broadcast the request to  
19 several other customized dictionaries, known as broadcast  
20 dictionaries, that can be located, for example, on various  
21 subscribers' servers. The broker dictionary can receive and  
22 compile search results from broadcast dictionaries, and transfer  
23 a single, composite search result to the initiating website. The  
24 broker dictionary can be utilized as an intelligent filter to

1 intelligently select only specific broadcast dictionaries that  
2 may be more likely to produce relevant search results.

3 In an embodiment, the methods and systems can identify  
4 customized dictionaries using a URL that can allow a remote  
5 server to access the dictionary, create a local copy, modify the  
6 copy, and transmit the modified copy to the original location for  
7 re-writing, etc.

8 Other objects and advantages will become apparent  
9 hereinafter in the specification and drawings.

10

11 BRIEF DESCRIPTION OF THE DRAWINGS

12

13 FIG. 1 displays an architectural block diagram of a system  
14 that practices the principles of the methods and systems  
15 described herein for a single data source;

16 FIG. 2 displays systems and methods according to FIG. 1 for  
17 an exemplary internet embodiment;

18 FIG. 3 displays systems and methods according to FIG. 1 for  
19 an exemplary query translation architecture;

20 FIG. 4 displays systems and methods according to FIG. 1 for  
21 an exemplary architecture providing query translation and  
22 retrieval;

23 FIG. 5 displays systems and methods according to FIG. 1 for  
24 an exemplary query translation, retrieval, and presentation  
architecture; and,

1 FIG. 6 is a diagram representing systems and methods in  
2 accordance with the principles of FIG. 1 that include a broker  
3 dictionary.

4

5 DESCRIPTION

6 To provide an overall understanding, certain illustrative  
7 embodiments will now be described; however, it will be understood  
8 by one of ordinary skill in the art that the systems and methods  
9 described herein can be adapted and modified to provide systems  
10 and methods for other suitable applications and that other  
11 additions and modifications can be made without departing from  
12 the scope hereof.

13 Referring now to FIG. 1, there is a block diagram of a  
14 system 100 that implements the techniques described herein. As  
15 will become apparent herein, the techniques as described in  
16 relation to FIG. 1 have many applications and embodiments, some  
17 of which can be referenced herein with respect to other figures.

18 FIG. 1, and other Figures provided herein, can therefore be  
19 understood to represent the techniques, and while pictorial  
20 objects can be represented in the Figures, those with ordinary  
21 skill in the art will understand that these pictorial objects can  
22 be provided for understanding only and are not intended to be a

1 limitation on the methods and systems. Accordingly, pictorial  
2 objects and their associated concepts can be combined with other  
3 pictorial objects, or additionally and optionally, separated into  
4 further pictorial objects, while not departing from the methods  
5 and systems.

6 As FIG. 1 indicates, the techniques herein can be initiated  
7 by a survey 102 of a data source 20. The survey can be automated  
8 or manually guided to identify data sources 20. As will be  
9 understood herein, data sources can include one or more textual  
10 documents, databases, etc., where a textual document can be  
11 understood to include a text file, web page, etc., that can be  
12 formatted text such as HTML, XML, some other SGML format, or  
13 another text format. A data source that is a database can use a  
14 format compatible with MySQL, SQL, Oracle, Informix, Sybase, the  
15 Freedom Engine, Access, ODBC, DB2, etc. Those with ordinary  
16 skill in the art will recognize that the methods and systems are  
17 not limited to the type or format of the data sources. Through  
18 the survey 102, the data source(s) can be analyzed with regard to  
19 data format, data type, data organization (e.g., categorization,  
20 hierarchical structure), relevant terms and phrases,  
21 relationships between words, terms, and phrases, identification  
22 of abbreviations or word/phrase variations, codes related to data

1 (purchase codes, product codes, price codes, or any other code  
2 that can relate to categorizing the product in terms of price,  
3 demographic appropriateness or characteristics, etc.) etc. Other  
4 information related to the data source can be manually provided.

5 In some embodiments, the survey can be automated, and additional  
6 information including the number of data sources, etc., can be  
7 determined. For the purposes of illustration with respect to the  
8 embodiment of FIG. 1, a database data source 20 is illustrated,  
9 although such an example is provided for illustration and not  
10 limitation, and multiple and varied format data sources,  
11 including textual data sources, can be utilized for the methods  
12 and systems.

13 A dictionary 18 can be formulated 104 based on the survey  
14 results 102. The dictionary 18 can be understood to be, for  
15 example, a computer program that can be implemented in a higher  
16 level language such as C, C++, Java, etc., that can receive query  
17 information as input, and can provide as output, a query  
18 formatted and otherwise customized for the data source.

19 Referring again to FIG. 1, query information 106 can be  
20 received by the dictionary 18. Although FIG. 1 illustrates only  
21 one dictionary 18, it can be understood that there can be

1 multiple dictionaries, and in such embodiments, the query  
2 information 106 can be received by the multiple dictionaries.  
3 The illustrated dictionary 18 can generate a customized query 110  
4 based on the received query information 106 and the survey  
5 results. The customized query 110 can be applied to the data  
6 source 20 from which the survey was conducted. The customized  
7 query results 112 can, in some embodiments, be returned to the  
8 dictionary 18. In some embodiments, the dictionary 18 can  
9 format, arrange, aggregate, etc., the customized query results  
10 112 and transfer or forward the results. For example, the query  
11 results 108 can be transferred to the entity that requested that  
12 supplied the query information 106, or another entity can be  
13 designated or otherwise specified to receive the query results  
14 108. As indicated previously herein, FIG. 1 illustrates the  
15 principles of the methods and systems which have wide  
16 applicability.

17 Referring now to FIG. 2, there is an architectural block  
18 diagram 10 of an illustrative system that utilizes the methods  
19 and systems for an internet application. The FIG. 1 system  
20 indicates an initiating device 12 that can include a digital  
21 computer system that can utilize a wired or wireless  
22 communications link to connect to a communication network such as

1 the internet. A user of the initiating device 12 can utilize  
2 different peripheral devices that can be integrated with or  
3 otherwise configured for compatible use with the initiating  
4 device 12. For example, the initiating device 12 can include a  
5 keyboard, keypad, stylus, digital camera, microphone, etc., that  
6 can communicate data to the initiating device using wired or  
7 wireless communications systems and/or protocols, etc. The  
8 initiating device 12 can be a microprocessor-based system  
9 including a computer workstation, such as a PC workstation or a  
10 SUN workstation, handheld, palmtop, laptop, personal digital  
11 assistant (PDA), cellular phone, etc., that includes a program  
12 for organizing and controlling the initiating device 12 to  
13 operate as described herein. Additionally and optionally, the  
14 initiating device 12 can be equipped with a sound and video card  
15 for processing multimedia data. The initiating device 12 can  
16 operate as a stand-alone system or as part of a networked  
17 computer system. Alternatively, the initiating device 12 can be  
18 dedicated devices, such as embedded systems, that can be  
19 incorporated into existing hardware devices, such as telephone  
20 systems, PBX systems, sound cards, etc. Accordingly, it will be  
21 understood by one of ordinary skill in the art that the

1 initiating device 12 described herein has wide applicability and  
2 can be incorporated in many systems, and realized in many forms.

3 For a system according to FIG. 1, the initiating device 12  
4 can be connected to a network such as the internet and can be  
5 equipped with what is well-known as an internet "browser" such as  
6 the commercially available Netscape Navigator, Internet Explorer,  
7 etc., browsers, and those with ordinary skill in the art will  
8 recognize that, depending upon the initiating device 12 and its  
9 configuration, the browser can differ, and hence references  
10 herein to a browser can include references to a user interface to  
11 the internet or other network, wherein the methods and systems  
12 herein are not limited to the browser or other network interface.

13 Furthermore, the initiating device 12 can access the internet  
14 using wired or wireless communications links and/or protocols.

15 The initiating device 12 can communicate with a server that  
16 can be represented in the FIG. 1 system as a System Server 14.  
17 The illustrated server 14 can be also be a microprocessor-based  
18 system including a computer workstation, such as a PC workstation  
19 or a SUN workstation, handheld, palmtop, laptop, personal digital  
20 assistant (PDA), cellular phone, etc., that includes a program  
21 for organizing and controlling the server 14 to operate as

1 described herein. Additionally and optionally, the server 14 can  
2 be equipped with a sound and video card for processing multimedia  
3 data. The server 14 can operate as a stand-alone system or as  
4 part of a networked computer system. Alternatively, the server  
5 14 can be dedicated devices, such as embedded systems, that can  
6 be incorporated into existing hardware devices, such as telephone  
7 systems, PBX systems, sound cards, etc. In some embodiments,  
8 servers can be clustered together to handle more traffic, and can  
9 include separate servers for different purposes such as a  
10 database server, an application server, and a Web presentation  
11 server. The server 14 can also include one or more mass storage  
12 devices such as a disk farm or a redundant array of independent  
13 disk ("RAID") system for additional storage and data integrity.  
14 Read-only devices, such as compact disk drives and digital  
15 versatile disk drives, can also be connected to the server 14.  
16 As used herein, the term "server" is intended to refer to any of  
17 the above-described servers. In an embodiment, the initiating  
18 device 12 and the server 14 can be similar systems.

19 In an embodiment of the FIG. 1 system, the initiating device  
20 12 can access the server 14 via the internet, and the server 14  
21 can provide a webpage or other interface to the initiating device  
22 12 to allow a user of the initiating device 12 to input data

1 indicative of a query for information. Those with ordinary skill  
2 in the art will recognize that this query information can be of  
3 varying formats, and can include one or more keywords and/or  
4 natural language terms or expressions that can optionally be  
5 linked using one or more logical operators, including boolean  
6 expressions or notations such as "and", "or", and "not". In some  
7 embodiments, additionally and optionally, "+" and "-" can be used  
8 to indicate desired and undesired terms, respectively, for  
9 example. Those with ordinary skill in the art will recognize  
10 that there are many different connectors and methods of relating  
11 keywords, sentences, questions, and/or natural language words or  
12 expressions that can be used.

13 For the purposes of the discussion herein, natural language  
14 can be understood to be a word, phrase, grouping of words, etc.,  
15 in a language written or spoken by humans.

16 Additionally and optionally, the query information can  
17 include a full text statement or question or other natural  
18 language data. The query information can be entered to the  
19 initiating device 12 and thereafter edited using one or more of  
20 multiple peripheral devices connected to the initiating device  
21 that can include a keyboard, keypad, stylus, mouse, microphone,

1 etc., wherein those of ordinary skill in the art will recognize  
2 that the methods and systems herein are not limited to the  
3 mechanism of inputting query information to the initiating device  
4 12. Furthermore, the methods and systems are not limited to the  
5 format of inputting the query information or a user interface  
6 that can be provided to facilitate such entry. For example, in  
7 some embodiments, the query information can be input using one or  
8 a combination of text input boxes, text documents, menu  
9 selections, drop-down boxes, radio buttons, etc. The illustrated  
10 initiating device 12 also can provide a user with the ability to  
11 initiate the search, and in one embodiment, search initiation can  
12 be understood as entering the query information.

13 Furthermore, the query information can be entered by a  
14 variety of formats, including human users that can utilize  
15 peripheral devices and/or integrated software to enter and/or  
16 retrieve data by, for example, a keyboard, stylus, voice  
17 commands, etc. In some embodiments, the query information can  
18 additionally and optionally be provided by automated and/or non-  
19 human sources using scripts or other programming techniques.  
20 Accordingly, references herein to a user of the initiating device  
21 12 can be understood to include any entity, human or non-human,

1 that can cause query information to be provided to the initiating  
2 device 12.

3           Upon initiation of a search or query by a user of the  
4 initiating device 12, for the FIG. 1 system, the initiating  
5 device 12 can transfer the query information to the server 14  
6 that can include a list of subscribers that can be included, in  
7 one embodiment, in a database 13. The subscriber database 13 can  
8 be accessed locally or through a network such as the internet  
9 using wired or wireless communications devices and protocols.  
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17           The subscriber database 13 can be understood to include a memory  
having one or more physical or logical partitions and/or  
segments, and can optionally and additionally utilize one or more  
of well-known database packages including MySQL, SQL, Oracle,  
Informix, Sybase, the Freedom Engine, Access, ODBC, DB2, etc.,  
with such examples provided for illustration and not limitation.

18           In an embodiment, the database 13 can reside in a memory of the  
19 server 14.

20           In an embodiment, the server 14 can access subscriber  
21 information from the database 13 to cause the query information  
to be distributed to one or more subscribers 16a, 16b, 16c. In  
the illustrated system, the database 13 can include URLs of

1 subscriber servers 16a, 16b, 16c (also referenced herein  
2 collectively or individually as 16). The query information can  
3 be transferred, distributed, or otherwise communicated to the  
4 subscriber servers 16 simultaneously as in a broadcast, or using  
5 an ordered scheme that can include network or load balancing  
6 schemes. The FIG. 1 system illustrates the communication of  
7 query information to three subscribers 16a, 16b, 16c although the  
8 methods and systems can be applied to one or more subscribers and  
9 the number of subscribers is not a limitation. For an embodiment  
10 wherein the system server 14 communicates to the subscriber  
11 servers 16 via a network such as the internet, the transfer of  
12 the query information can be performed using HTTP or HTTPS, for  
13 example, although such an example is provided for illustration  
14 and not limitation.

15 The illustrated subscribers 16a, 16b, 16c can be servers as  
16 described previously herein with respect to the System Server 14.  
17 The servers 16 can include one or more data sources 20a, 20b,  
18 20c, 20d (also referenced herein collectively or individually as  
19 20). The subscribers 16 also include a dictionary 18a, 18b, 18c,  
20 18d (also referenced herein collectively or individually as 18)  
21 that can be associated with and based on the data sources 20a,  
22 20b, 20c, 20d. In an embodiment such as that of FIG. 1, a data

1 source 20 can be associated with a dictionary 18, although in  
2 some embodiments, one dictionary 18 can be associated with more  
3 than one data source 20. Alternately, in an embodiment, one data  
4 source 20 could be associated with more than one dictionary 18.

5 For the illustrated systems and methods, as described  
6 previously herein, a dictionary 18 can be understood to be a  
7 translator between the received query information, received from  
8 the System Server 14 as described herein, and a data source 20.  
9  
10 For the illustrated systems where one dictionary 18 corresponds  
11 to a data source 20, a dictionary 18 can be formed by installing  
12 a computer program on the subscriber server 16. In an  
13 embodiment, the computer program can be run from a remote  
14 location via a network. As indicated previously, in some  
15 embodiments, the survey computer program can be understood as a  
16 survey engine that examines the data sources 20 on the server 16.

17 As indicated previously, the dictionary 18 can incorporate the  
18 survey engine results to provide a customized interface between  
received query information, and the data source 20.

19 For example, if the data source 20 is a database, the survey  
20 engine can identify labels of tables, rows, and columns, and  
21 abbreviations of labels, when necessary. This survey information

1 can be incorporated into a dictionary 18 to allow received query  
2 information to be properly translated for the database. In the  
3 case of a database, query information from a user of the  
4 initiating device 12 can be an input to a dictionary 18, and the  
5 dictionary output can be a customized SQL query that uses  
6 terminology, abbreviations, etc., derived from the survey engine.

7 In some embodiments, the dictionary output can be a customized  
8 HTTP search string that can utilize a general access method that  
9 can be created for the data source (e.g., the HTTP search string  
10 can be formatted based on drop-down menus/boxes, radio button  
11 selections, and/or other general access provisions). In an  
12 example of a database embodiment, a database can be configured  
13 with columns or rows that relate to colors that are abbreviated,  
14 such as "Rd" for Red, "Bl" for Blue, etc. If query information  
15 is submitted with the word "Blue", the customized dictionary can  
16 cause a customized query to be formatted using "Bl" according to  
17 the survey information. Accordingly, row information and column  
18 information can be understood herein to include a  
19 characterization of the database information that can include  
20 header information, element information, extraneous information  
21 that can otherwise provide insight to the database, etc.

1           Additionally and optionally, when the data source 20 is  
2           text, the survey engine can scan the text, identify synonyms,  
3           abbreviations, etc., for incorporation into a dictionary 18. A  
4           dictionary for a text data source 20 can format received query  
5           information into an advanced text query that can utilize a  
6           standard text engine. Some examples of standard text engines can  
7           include AltaVista, Excite, Google, Infoseek, Inktomi, Microsoft  
8           Index Server, etc., although such examples are provided for  
9           illustration and not limitation. Optionally and additionally,  
10           the dictionary can convert the received query information into a  
11           HTTP query that can be formatted according to a web page on the  
12           server 16, where the web page can include text input boxes, radio  
13           buttons, drop-down boxes, check-boxes, etc.

14           The illustrated dictionaries 18 can also include a natural  
15           language and linguistic processor that is well-known in the art  
16           for parsing received information, performing context analysis,  
17           generating synonyms, etc. The dictionaries 18 also include a  
18           spell corrector that can verify word spellings and generate  
19           phonetic equivalents, although such features can reside  
20           independent of the spell corrector. The dictionaries 18 can also  
21           perform word variations to better interpret and/or distinguish  
22           words, for example, between similar words such as "build",

1 "builder", and "building." Furthermore, the dictionaries 18 can  
2 perform phrase identification that includes identifying word  
3 groups within context. For example, "wrinkle-free" can be  
4 interpreted with respect to clothes, or in another manner with  
5 respect to plastic surgery. Accordingly, it can be understood  
6 that the dictionaries 18 for the illustrated systems and methods  
7 can extend the received query information to include terminology  
8 that is compatible with, understood by, and/or interpreted by a  
9 data source 20 to which the dictionary 18 corresponds.

10 A dictionary 18 can be equipped with a foreign language  
11 translator to convert received query information from one  
12 language, to another language that is compatible with the data  
13 source 20. In some embodiments, a dictionary 18 can be  
14 established for different languages, while in another embodiment,  
15 a single dictionary 18 can translate queries for multiple  
16 languages.

17 A dictionary 18 can determine that received query  
18 information from the initiating device 12 is not compatible with  
19 the data source 20 or otherwise cannot be interpreted. In an  
20 embodiment, the dictionary 18 can generate a list of possible  
21 interpretations for a user of the initiating device 12 to select.

1           Additionally and optionally, the dictionary 18 can cause the  
2           initiating device 12 to provide a user with a request for  
3           additional, alternate, or restated query information.

4           A dictionary 18 can also identify a Frequently Asked  
5           Question (FAQ) and supply either a pre-defined answer to a user  
6           at the initiating device 12, or redirect the user to, for  
7           example, a web page that includes an answer. A dictionary 18 can  
8           also recognize and respond appropriately to query information  
9           that seeks a "yes" or "no" answer, time-based queries using date  
10           or time terminology including "now", "last month", "before",  
11           "between", etc., and arithmetic queries that can include  
12           mathematical concepts such as "lowest-priced", "top 5", "less  
13           than", etc.

14           In the illustrated systems and methods, results of a  
15           customized data source search can be provided to a dictionary 18,  
16           and the dictionary 18 can thereafter organize, format, etc., the  
17           search results for return to the initiating device 12. The  
18           information can be presented via the subscriber server 16 to the  
19           System Server 14 and hence to the initiating device 12, or  
20           directly from the subscriber server 16 to the initiating device  
21           12. In one embodiment, the search results can be formatted in

1       XML to allow the server 16 to format the results according to a  
2       web application that can be executing on the subscriber server  
3       16. For example, the XML output from the dictionary 18 can be  
4       used in Extensible Stylesheet Language (XSL) stylesheets or other  
5       web formatting options. Those with ordinary skill in the art  
6       will recognize that many formats for the dictionary output can be  
7       utilized, and the use of XML herein is provided for illustration  
8       and not limitation. For example, in one embodiment, HTML  
9       templates can be utilized to present search results directly to  
10      an internet browser without requiring additional programming.  
11      Other forms of SGML documents or other textual formats can be  
12      used without departing from the scope of the techniques provided  
13      herein. Alternately, search results can be presented graphically  
14      using bar charts, pie charts, histograms, Excel compatible  
15      spreadsheets, etc. Search results can also be saved as an Excel  
16      compatible file for later analysis. Additionally and optionally,  
17      the methods and systems herein can allow the search results to be  
18      provided to an application through a variety of Application  
19      Programmer Interfaces (APIs).

20           In some embodiments, the requested query information can  
21       provide significant search results. The methods and systems  
22       herein can provide the search results using a format that

1 includes categories and sub-categories from which a user at the  
2 initiating device 12, for example, can further select. Aggregate  
3 data can also be presented with hyperlinks to detailed  
4 information to allow users to retrieve further information  
5 without providing further details, follow-up questions, etc.  
6 Those with ordinary skill in the art will thus recognize that  
7 although the methods and systems presented herein are provided  
8 with respect to an internet illustration that includes browsers,  
9 etc., other interfaces can be utilized to retrieve query  
10 information and present query results.

11 A user or system manager associated with a server 16 can  
12 provide or otherwise designate filtering schemes for providing  
13 search results. A subscriber, for example, can determine to  
14 exclude products from particular users based upon a received  
15 profile (i.e., age, etc.). Those with ordinary skill in the art  
16 will recognize that there are many parameters by which a  
17 subscriber can filter or otherwise customize the search results.

18 The methods and systems can operate with security measures  
19 that can be established by a system manager related to a server  
20 16. For example, query information can be received or otherwise  
21 associated with identity information. A dictionary 18 can be

1       configured to prevent the query information from being applied to  
2       a data source for which the user is not allowed to otherwise  
3       access. In such an embodiment, the methods and systems herein  
4       can be incorporated behind a firewall.

5               Those with ordinary skill in the art will recognize that the  
6       methods and systems can also be practiced outside of a firewall.

7               In such an embodiment, a distributed or other search can be  
8       performed across a network such as the internet or an intranet,  
9       wherein accessibility to the data sources may not be protected by  
10      a firewall. As indicated previously, search results can be  
11      aggregated at the initiating device 12 or another remote device  
12      for presentation to a user.

13              A dictionary 18 can also generate an output log that can be  
14       understood to be a computer file that can be accessed by a system  
15       administrator or other authorized individual or entity according  
16       to the server 16 configuration or other authorization scheme.  
17              The log file can be stored locally on the server 16 or another  
18       memory device connected to the server 16 through a wired or  
19       wireless network. The log files can be configured to provide  
20       data pertaining to received query information, customized search  
21       queries, generated search results, query identity, data source

1 identity, time of query, etc., with such examples provided only  
2 for illustration. By editing the log file, a system  
3 administrator can view the effectiveness of the dictionary with  
4 respect to query information, desired results, security, etc.  
5 Filters can be applied to the log files to provide log results  
6 based on results generated, date, time of day, time period, etc.

7 In the illustrated embodiments, a system administrator or  
8 other authorized user can edit a dictionary 18 to further  
9 customize the dictionary 18. Such edits can result from an  
10 analysis of the log file, for example. Dictionary edits can also  
11 be performed to further enhance business objectives. For  
12 example, automated, scheduled searches can be performed to query  
13 databases for stock information, etc. In an embodiment, an email  
14 can be generated based on a search. For example, in an automated  
15 search established by an administrator to verify stock quantity,  
16 once a stock quantity reaches a predetermined value, an email can  
17 be sent to the administrator and/or another interested party.

18 A system manager or other authorized user can also customize  
19 a dictionary 18 and provide rules against which searches can be  
20 performed and search results can be presented. For example, a  
21 system manager can edit the dictionary to include a formula or

1 rule for determining a profit margin, and have results presented  
2 in order of profit margin. Other rules could present results by  
3 vendor, product availability, price, etc., with such examples  
4 provided for illustration and not limitation. Such manual  
5 customization of a dictionary 18 can be performed and applied  
6 according to a particular user, or a group of users. The  
7 dictionary editing can be performed locally or via a network.

8 In some practices of the systems and methods, system  
9 requirements can provide for certain query information to be  
10 provided. If the query information is not provided by the user  
11 at the initiating device 12, the user can be prompted to enter  
12 the remaining information.

13 Accordingly, a dictionary 18 can include one or more of  
14 relevant content and/or values from a data source 20, a  
15 representation of schemas, relationships, and category  
16 hierarchies from the data source 20, configuration settings  
17 according to users and/or groups of users, business rules,  
18 terminology definitions or specifications, synonyms, a language  
19 translator, a natural language processor, an output data  
20 formatter, and a log file generator.

1           The methods and systems herein can also allow for the  
2           aggregation of customized query results from multiple data  
3           sources and/or dictionaries. For example, as provided herein,  
4           query information submitted at an initiating device 12 can be  
5           broadcast to one or more dictionaries in broadcast or some other  
6           sequenced manner, wherein the search results can be filtered or  
7           otherwise aggregated at the System Server 14. The filtering or  
8           other presentation of information performed by the System Server  
9           14 can be performed additionally and optionally to filtering and  
10           organization that can be performed at individual dictionaries 18  
11           and or servers 20.

12           Referring now to FIG. 3, there is a diagram representing the  
13           methods and systems in an embodiment that can be known as a query  
14           translation embodiment 30. In the FIG. 3 configuration, query  
15           information can be presented to the system 32 through an API 33  
16           and to a query translator 34. The query translator 34 can  
17           translate the query information into a SQL statement, advanced  
18           text search expression, HTTP call, etc, by accessing a dictionary  
19           18 that corresponds to a data source 20 to be searched. For the  
20           FIG. 3 embodiment, a server 16 can provide the received query  
21           information to the system 32 to receive from the system 32 via  
22           the query translator 34, a SQL statement, advanced text search

1 expression, HTTP call, etc. The server 16 can thereafter submit  
2 or apply the returned search to a relational database, text  
3 search engine, etc.

4 Referring to FIG. 4, there is a diagram of a configuration  
5 40 for the methods and systems that can allow the return of a  
6 data set for formatting a search request, by an application that  
7 can reside on the server 16 or another device. As indicated by  
8 FIG. 3, query information can be provided by the server 16. The  
9 query information can include or be accompanied by a dictionary  
10 selection, a user ID, business rules, etc., and a desired output  
11 format to the system 42 through its API 33. This interface can  
12 be implemented using HTTP, Component Object Module (COM), Java,  
13 Enterprise, Javabean, C, C++, Visual Basic, or another well-known  
14 method. The natural language query, dictionary selection, and  
15 output format can be input to a query processor 44 that includes  
16 a data access module 46 that transfers the query information and  
17 dictionary selection to a query translator 34. The query  
18 translator 34 can utilize the specified dictionary 18 and query  
19 information to generate a customized query as provided herein.  
20 Those with ordinary skill in the art will recognize that although  
21 FIG. 4 depicts a single dictionary 18 and query translator 34,  
22 the embodiment of FIG. 4 can include multiple dictionaries and/or

1 query translators. The customized query can be transferred to  
2 the data access module 46 that can issue the customized query to  
3 the data source 20 corresponding to the query. FIG. 4  
4 demonstrates two data sources 20 that include a relational  
5 database management system 20a and a text search engine 20b,  
6 although other data sources can be utilized and specified. The  
7 customized query search results can be returned to the data  
8 access module 46 and thereafter transferred to the formatting  
9 module 48 with the specified output format. The formatting  
10 module 48 can format the query results based on the specified  
11 format, and transfer the formatted output to the server 16  
12 through the API 33. In an embodiment, the formatted results can  
13 be transferred to the server 16 in XML format. A web application  
14 on the server 16 or another location can transform the XML search  
15 results into a desired presentation style using, for example, the  
16 W3C standard extensible stylesheet language transformation (XSLT)  
17 and HTML.

18 Referring to FIG. 5, there is a diagram for an embodiment 50  
19 where the search results can be presented to a server application  
20 in a ready-to-display format. As was shown in FIG. 4, in FIG. 5,  
21 a server 16 can provide query information, dictionary selection,  
22 and output format to the data access module 46 of the query

1 processor 44. The data access module 46 can provide the query  
2 information and dictionary selection to the query translator  
3 module 34 that utilizes the specified dictionary 18 to generate a  
4 customized search or query. The customized search can be  
5 provided to the data access module 46 and executed against the  
6 appropriate data source 20. The results of the search can be  
7 returned to the formatting module 48 via the data access module  
8 46, with the specified output format. The formatted search  
9 results can be provided to the server 16 for display. In the  
10 illustrated system of FIG. 4, the formatted results can be fully  
11 customizable HTML templates for output to the internet, and can  
12 include colors, headers, footers, and other customizable  
13 characteristics to match the web site. The HTML can additionally  
14 and optionally include graphs, pie charts, bar graphs, reports,  
15 and spreadsheets that can be displayed using, for example,  
16 ActiveX control or Java applet.

17 As indicated with reference to FIG. 4, the system and  
18 methods according to FIG. 5 can be practiced with multiple query  
19 translators 34 and/or dictionaries 18. Additionally, the data  
20 sources 20a, 20b can be multiple and can include other data  
sources than illustrated. In the embodiments herein, although

1 identification can be provided with a query request, some  
2 embodiments may not utilize query information.

3 Referring now to FIG. 6, there is shown an embodiment 60  
4 wherein a "broker dictionary" 18e can be utilized to interface to  
5 other dictionaries and data sources. One of ordinary skill in  
6 the art will recognize from the description of the methods and  
7 systems provided herein, that a server 16 that is not  
8 illustrated, can be associated with the broker dictionary 18e.  
9  
10 The illustrated broker dictionary 18e can include, for example,  
11 URLs of other servers at different locations in a local or other  
12 network (e.g., internet, intranet, LAN, WAN, etc.) that have  
13 relevant data sources and/or dictionaries. Dictionaries to which  
14 the broker dictionary 18e can communicate can be referred to  
15 herein as broadcast dictionaries. In an embodiment, the broker  
16 dictionary 18e can provide an interface for a subscriber 16 with  
17 multiple servers. The multiple servers can maintain different  
18 customized dictionaries, or can share the broker dictionary 18e.  
19  
20 In some embodiments, the broker dictionary 22 can interface to  
21 multiple subscribers 16 and/or data sources 20.

22 According to the FIG. 6 system, the broker dictionary 18e  
23 can receive query information from the initiating device 12 and

1 the broker dictionary 18e can filter the search request to  
2 eliminate broadcast dictionaries and/or data sources 20 that do  
3 not include data relevant to the query information. The broker  
4 dictionary 18e can therefore include sophisticated and  
5 intelligent filters to eliminate unneeded broadcast search  
6 requests. Those with ordinary skill in the art will recognize  
7 that the broker dictionary 18e can include the attributes  
8 previously provided to dictionaries in general, including but not  
9 limited to language translation, synonym generation, natural  
10 language processing, business rules, etc.

11 The broker dictionary 18e can relay or broadcast query  
12 information, as processed by the broker dictionary 18e,  
13 unprocessed, or a combination thereof, to the selected broadcast  
14 dictionaries 18f, 18g, 18h and other data sources 20e, 20f, 20g.

15 For example, in the illustrated system of FIG. 5, the broker  
16 dictionary 18e can process the query information to provide a  
17 customized query that can be provided to the non-broadcast  
18 dictionary data sources 20e, 20f, 20g. Similarly, the broadcast  
19 dictionaries 18f, 18g, 18h can receive either the customized  
20 query information or the original query information from the  
21 initiating device 12. In either case, the broadcast dictionaries  
22 18f, 18g, 18h can process the received query information from the

1 broker dictionary 18e, and distribute a customized query to one  
2 or more data sources 20h, 20i, 20j as provided previously herein.

3 The customized query results from the different data sources  
4 20e-20j can be transmitted or otherwise transferred to the broker  
5 dictionary 18e. The illustrated broker dictionary 18e can  
6 receive customized query search results and format the results to  
7 present a single result package to the initiating device 12 or  
8 other server 16 or application as provided herein. In some  
9 embodiments, the broker dictionary 18e can filter the search  
10 results before transferring or communicating the search results  
11 as provided herein.

12 Those with ordinary skill in the art will recognize that the  
13 systems and methods herein can include one or more databases that  
14 can be in communication with the servers 16 but are not otherwise  
15 illustrated in the representative figures. For example, a  
16 database can be utilized to maintain information based on user  
17 identity and privileges, broker dictionaries and associated  
18 broadcast dictionaries, rules for filtering query results, etc.

19 Accordingly, it can be understood that the methods and  
20 systems disclosed herein can be applied to a variety of queries.  
21 For example, the query information initially submitted can be a

1 question, such as "How far is bank XXX from home?", such that  
2 data pertinent to the user (e.g., "home") and data related to a  
3 another sensor or entity (e.g., mapping program or distance  
4 calculator) can be integrated with the query information to  
5 provide an appropriate response. Questions can be presented in  
6 succession, and results from one question can be a basis as input  
7 to the dictionary for subsequent questions.

8 The techniques described herein are not limited to a  
9 particular hardware or software configuration, and may find  
10 applicability in many computing or processing environments. The  
11 techniques can be implemented in hardware or software, or a  
12 combination of hardware and software. The techniques can be  
13 implemented in one or more computer programs executing on one or  
14 more programmable computers that include a processor, a storage  
15 medium readable by the processor (including volatile and non-  
16 volatile memory and/or storage elements), one or more input  
17 devices, and one or more output devices.

18 The computer program(s) is preferably implemented in one or  
19 more high level procedural or object-oriented programming  
20 languages to communicate with a computer system; however, the

1 program(s) can be implemented in assembly or machine language, if  
2 desired. The language can be compiled or interpreted.

3 The computer program(s) can be preferably stored on a  
4 storage medium or device (e.g., CD-ROM, hard disk, or magnetic  
5 disk) readable by a general or special purpose programmable  
6 computer for configuring and operating the computer when the  
7 storage medium or device is read by the computer to perform the  
8 procedures described herein. The system can also be considered  
9 to be implemented as a computer-readable storage medium,  
10 configured with a computer program, where the storage medium so  
11 configured causes a computer to operate in a specific and  
12 predefined manner.

13 One potential advantage of the methods and systems is that  
14 an internet user may obtain reliable, accurate, and efficiently  
15 organized information in response to a search or query request.

16 What has thus been described is a method and system for  
17 providing efficient searching of devices on communications  
18 networks, such as servers on the internet, using an application  
19 that can survey a subscriber's server that can include a catalog  
20 and database, and use the formatting information and data from  
21 the survey to create a dictionary customized to the subscriber's

1 data sources. A user seeking information can initiate a search  
2 from an initiating device using keywords, natural language terms,  
3 connectors, expressions, etc., wherein such query information can  
4 be transmitted to various subscriber customized dictionaries.  
5 The customized dictionaries can customize the query based on  
6 respective subscriber databases and text documents, text search  
7 engines, etc., to produce an accurate search result. The search  
8 results can be filtered and integrated for presentation to the  
9 initiating device. Search results can be customized using user  
10 preference or profile information.

11 Although the methods and systems have been described  
12 relative to specific embodiments thereof, the methods and systems  
13 are not so limited. Obviously many modifications and variations  
14 may become apparent in light of the above teachings. For  
15 example, although the illustrated embodiment presented herein  
16 related to the internet, the methods and systems can be applied  
17 to searching other devices on other communications networks.  
18 Although HTML and XML languages were utilized to facilitate the  
19 searching, other languages may be utilized. The survey program  
20 can be run locally on a server, or remotely from another  
21 platform. Similarly, a dictionary can be accessed and/or managed  
22 locally or remotely using wired or wireless communications

systems and methods. Results of customized queries can be aggregated at a server having multiple data sources, and thereafter transferred to the system server that can aggregate the results. In another embodiment, an application residing on the initiating device can receive and aggregate the results for presentation on the device. In an embodiment, search results can be displayed according to a user identification and/or information stored in a central database or local memory that includes user-specific preferences. The preferences can indicate suppliers, price, and other search-relevant criteria that can be submitted with the natural language search terms. In embodiments utilizing a user account for preferences, the respective subscriber dictionaries can integrate the user's preferences with the search terms to increase the probability of satisfying a search query for a user. In another embodiment, a user can be prompted for preference criteria, while in another embodiment, user identification data can be entered and submitted with the search criteria. Upon receiving the user identification data, a dictionary can cause a pre-stored user profile to be extracted and incorporated into the search.

In some embodiments, a user can be presented with search results and can select the desired results for purchase. Search

1 results can be accompanied by a URL of the order processing  
2 system that can be used to order the product; and, when the user  
3 selects the item, the relevant product information can be  
4 submitted to the purchasing system to initiate the purchase  
5 process. In an embodiment, the user's selection of a product can  
6 provide a transition to an order basket or other ordering scheme  
7 that can be provided by the initiating website, the subscriber's  
8 website, or an alternate website. In these embodiments, the  
9 ordering scheme can interface to a browser or other interface at  
10 the initiating device.

11  
12 Data sources and dictionaries do not have to reside on the  
13 same server, medium, etc. Additionally, methods of presenting a  
14 query and presenting query results can be integrated with instant  
15 messaging and/or email.

16 Many additional changes in the details, materials, and  
17 arrangement of parts, herein described and illustrated, can be  
18 made by those skilled in the art. Accordingly, it will be  
19 understood that the following claims are not to be limited to the  
20 embodiments disclosed herein, can include practices otherwise  
21 than specifically described, and are to be interpreted as broadly  
as allowed under the law.